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HUMAN ACTIVITY RECOGNITION USING MACHINE LEARNING

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Abstract:

With the increasing number of anti-social events taking place, there has been a recent focus on security. Many organizations have installed CCTV to constantly monitor people and their interactions. In a developed country with a population of 64 million, each person is caught on camera 30 times a day. A large amount of video data generated and stored over a period of time. A 704 x 576 image recorded at 25 frames per second will generate roughly 20GB per day. Continuous monitoring of data by humans to assess whether events are abnormal is an almost impossible task as it requires manpower and their constant attention. This creates a need to automate the same. It is also necessary to show in which frame and which part of it contains the unusual activity, which helps to quickly assess the unusual activity as abnormal. This is done by converting video to images and analyzing people and activating them from the processed image. Machine learning and deep learning algorithms and techniques support us in broad adoption to make it possible.

I. INTRODUCTION

The human face and the pattern of human behaviour play an important role in identifying persons. A key resource for such identifications is visual information. Tracking videos provide such visual information that can be displayed as live videos or replayed for future reference. The recent trend of "automation" is also having an impact in the field of video analytics.

Video analytics can be used for a wide range of applications such as motion detection, human activity prediction, person identification, abnormal activity recognition, vehicle counting, people counting in crowded places, etc. In this domain, there are two factors that are used for person identification are technically termed as face recognition respectively. Among these two techniques, face recognition is more versatile for automated person identification through surveillance videos. Face recognition can be used to predict the orientation of a person's head, which in turn will help to predict a person's behaviour. Motion recognition with face recognition is very useful in many applications such as verification of a person, identification of a person and detecting presence or absence of a person at a specific place and time. In addition, human interactions such as subtle contact among two individuals, head motion detection, hand gesture recognition and estimation are used to devise a system that can identify and recognize suspicious behaviour among pupil in an examination hall successfully. paper provides a methodology for detecting suspicious human activity using facial recognition.

Video processing is used in two main domains such as security and research. Such a technology uses intelligent algorithms to monitor live videos. Computational complexities and time complexities are some of the key factors while designing a real-time system. The system which uses an algorithm with a relatively lower time complexity, using less hardware resources and which produces good results will be more useful for time-critical applications like bank robbery detection, patient monitoring system, detecting and reporting suspicious activities at the railway station, etc Manual monitoring of exam hall through invigilators and manual monitoring of exam hall through surveillance videos is performed throughout the world. Monitoring an examination hall is a very challenging task in terms of man power. Manual monitoring of examination halls may be prone to error during human supervision. Such a system when implemented as an 'automatic suspicious activity detection system' will not only help in detecting suspicious activities but also helps in minimizing such activities. Moreover, the probability of error will be much lesser. This system will serve as a useful surveillance system for educational institutions.

This paper describes a technology in which real time videos are analysed and are used for human activity analysis in an examination hall, thus helping to classify whether the particular person's activity is suspicious or not. The system developed identifies abnormal head motions, thereby prohibiting copying. It also identifies a student moving out of his place or swapping his position with another student. Finally the system detects contact between students and hence prevents passing incriminating material among students. In our research, we have contributed upon a system that will intellectually process live video of examination halls with students and classify their activities as suspicious or not. This research proposes an intelligent algorithm that can monitor and analyse the activities of students in an examination hall and can alert the educational institute's administration on account of any malpractices/suspicious activities.

The scope of our project is to develop a real time activity recognition system which ultimately controls the image with a jpg extension and the camera samples of real- time webcam method.

During the project, four gestures were chosen to represent four navigational commands that are sitting, standing, bending and sleeping. A simple computer vision application was written for the detection and recognition of the four gestures and their translation into the corresponding commands for the actions and tracking. Thereafter, the program was tested on a webcam with actual movement of the person in real-time and the results were observed.

I. EXISTING SYSTEM

The problem is to predict the activity given a snapshot of sensor data, typically data from one or a small number of sensor types. Generally, this problem is framed as a uni-variate or multivariate time series classification task. It is a challenging problem as there are no obvious or direct ways to relate the recorded sensor data to specific human activities and each subject may perform an activity with significant variation, resulting in variations in the recorded sensor data. The intent is to record sensor data and corresponding activities for specific subjects, fit a model from this data, and generalize the model to classify the activity of new unseen subjects from their sensor data.

III. PROPOSED SYSTEM

Human activity recognition remains to be an important problem in computer vision. HAR is the basis for many applications such as video surveillance, health care, and human-computer interaction. Methodologies and technologies have made tremendous development in the past decades and have kept developing up to date. However, challenges still exist when facing realistic sceneries, in addition to the inherent intraclass variation and interclass similarity problem.

In this review, we divided human activities into three levels including action primitives, actions/activities, and interactions. We have summarized the classic and representative approaches to activity representation and classification, as well as some benchmark datasets in different levels. For representation approaches, we roughly sorted out the

research trajectory from global representations to local representations and recent depth-based representations.

The literatures were reviewed in this order. State-of-the-art approaches, especially those depth-based representations, were discussed, aiming to cover the recent development in HAR domain. As the next step, classification methods play important roles and prompt the advance of HAR. We categorized classification approaches into template-matching methods, discriminative models, and generative models. Totally, 7 types of method from the classic DTW to the newest deep learning were summarized. For human tracking approaches, two categories are considered namely filter-based and kernel-based human tracking. Finally, 7 datasets were introduced, covering different levels from primitive level to inter- action level, ranging from classic datasets to recent benchmark for depth-based methods.

Though recent HAR approaches have achieved great success up to now, applying current HAR approaches in real-world systems or applications is still nontrivial. Three future directions are recommended to be considered and further explored.

IV. CONCLUSION

According to present circumstances designing an automatic approach for detecting suspicious activity from video data for video surveillance systems is an important requirement. Unfortunately most existing approaches are hugely depending on human observers and there is no unified framework to meet this requirement.

In this paper, we proposed a self trainable, human activity and behaviour detectable Intelligent Suspicious Activity Detection Framework (ISADF) for video surveillance systems. This framework contained video and extraction unit will extract the video data images as frameset and sends to video data processing unit for suspicious activity detection. Behaviour Interpretation algorithm will compare the current activity against past experience to know whether activity is common, uncommon or unknown activity. BI Algorithm gives the activity type to SVM classifier to determine the level of activity ranges from 1 to 4. Experiments show that ISADF is able to process and identify the suspicious activities from KTH video data.

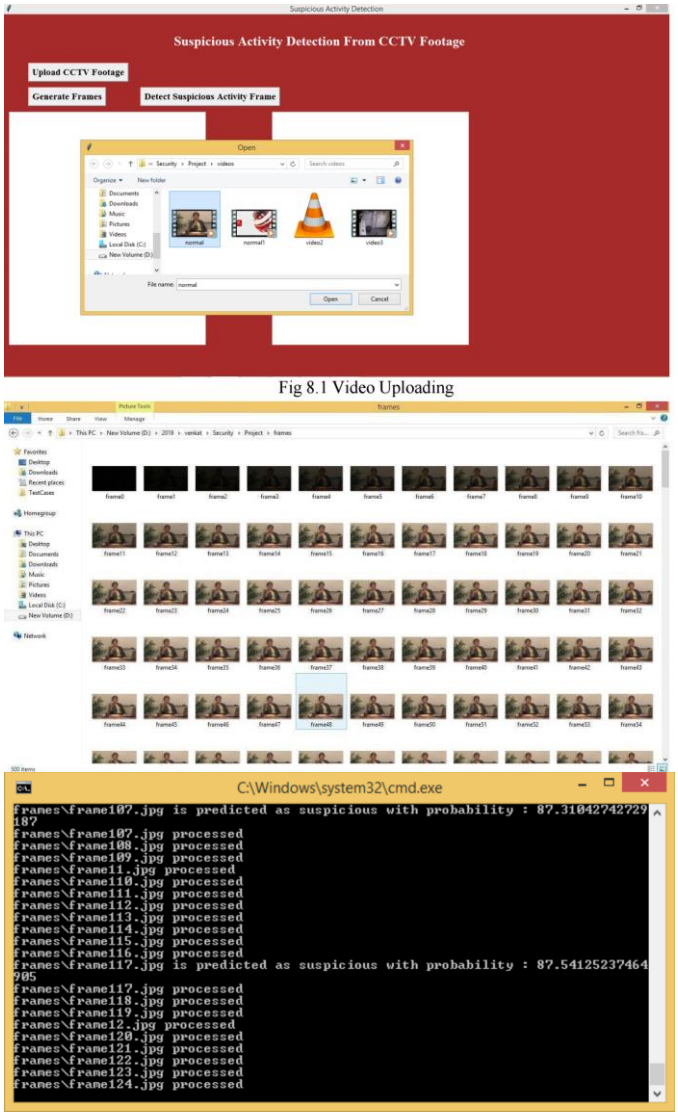

Fig 8.1 Video Uploading

Fig. 1 A picture that shows prediction of suspicious probability through video uploading and generated frames.

Fig. 2 A picture that shows recognised suspicious activity in a particular frame.

REFERENCES

[1] *Davide Anguita, Alessandro Ghio, Luca Oneto, Xavier Parra, Jorge L. Reyes Ortiz(2012). Human Activity Recognition on Smartphones Using a Multiclass Hardware Friendly Support Vector Machine. Springer International Workshop on Ambient Assisted Living.Lecture notes in Computer Science. Vol(7657), pp 216- 223.*

[2] Jun Liu, Amir Shahroudy, Dong Xu, Gang Wang(2016). Spatio-Temporal LSTM with Trust Gates for 3D Human Action Recognition. European Conference on Computer Vision., pp 816-833. Vol(9907) Oyelade, Oladipupo, Obagbuwa(2010). Application aof k-Means Clustering algorithm for prediction of Students'

[3] Academic Performance. International Journal of Computer Science and Information Security,7(1).292-295

[4] JuhaVesanto(1999). SOM-Based Data Visualization Methods. Intelligent Data Analysis, Laboratory of Computer and Information Science, Helsinki University of Technology, P. O. Box 5400, FIN-02015 HUT, Finlandvol. 3(2), pp. 111-126.

[5] Ivan Viola(2010). Information Theory in Computer Graphics and Visualization. Proceeding in SA'11SIGGRAPH Asia 2011 Courses.

[6] Jiang, L., Zhang, H., &Cai, Z. (2009). A novel Bayes model: Hidden NaïveBayes.IEEE Transactions on Knowledge and Data Engineering, 21(10),1361–1371.